Noviscape Consulting Group Company Limited

The Innovation-Led Development Path in the Philippines Project:

Reflection and Recommendation

Dr. Pun-Arj CHAIRATANA
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Acknowledgements

Conducting a community innovation survey (CIS) is considered a new frontier for a statistician and a science, technology, and innovation policy maker in Southeast Asia. Fortunately, there is a small community of practitioners and theorists in the region who occasionally share their expertise and insight regarding to a path and process of this particular census.

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1. Introduction

Background to the report

Towards an Innovation-led Development Path in the Philippines is a project supported by the International Development Research Center (IDRC) of Canada, which aims to mainstream the "innovation system" approach into the center-stage of policy-making through the establishment of a systems-oriented, policy-relevant, and internationally comparable innovation survey and indicator system in the Philippines by implementing pilot-testing of a community innovation survey (CIS) in four major cities: in Luzon (Quezon City and Laguna and Cavite), Visayas (Cebu City), and Mindanao (Davao City).

Objectives

The international consultancy aims to ensure that the innovation survey will be designed and implemented as internationally comparable, systems-oriented and policy relevant based on the best international practices. This includes a provision of all relevant insights and knowledge on how to effectively and efficiently conduct innovation survey research in the context of a developing country like the Philippines.

The report fulfills the mandate of the International Development Research Center (IDRC) for the offer of consulting contract number 105177-002. It covers items a-j of TOR. The specific objectives of the consultation report include:

a) Travelling to the Philippines from 21 to 26 November 2010 to attend the Filippinnovation Forum and to undertake field trips to Cebu and Davao

b) Conducting a survey of literature and assess experiences and practices of developing countries with a special focus on those in Southeast Asia

c) Reviewing and commenting on the innovation survey questionnaire and instrument designed by the DOST project team based on existing international practices

d) Recommending and prescribing the table formats for tabulating and/or consolidating the innovation survey results

e) Preparing and submitting to the national project steering committee and analysis guide for the innovation survey results in four selected sites and in preparing a consolidated national report

f) Reviewing and commenting on innovation policies based on the innovation survey results

g) Contributing to a national report innovation survey

h) Providing other information that is deemed relevant and important to the successful implementation of the projects

i) Answering any queries or updating information throughout the duration of the engagement through e-mail and other means of communications, and

j) Submitting the fact finding report and detailed final report to the IDRC

Structure of the report

There are two main sections for this consultation report, reflection and recommendation. The first section reflects the information and related review on CIS with special reference to the Filipino context. The second section focuses on analysis, guideline, and recommendation to the projects. Development of review and recommendation for the project is based on six documents that the consultant received from the Department of Science and Technology (DOST), which are:

1) Survey of innovation activities by establishments (SIA Form) questionnaire
2) The final report: 2009 survey on innovation activities in Metro Cebu
3) Survey on Innovation Activities 2009: Davao City Results
4) Results of the survey of innovation activities for establishments in Quezon City
5) Survey of innovation activities: Philippines Economic Zone Authority Establishments in Laguna and Cavite
6) Results of the 2009 survey of innovation activities (SIA)

Document number 1 had been used in questionnaire form for all four targeted cities. Document numbers 2 – 5 describe and analyze data and information received from each community innovation survey (CIS), while document number 6 compiles and consolidates all results by following the concept of a national innovation system.

2. Reflection

2.1 Fact Finding Mission

There are three selected areas and four sites for the pilot innovation survey, which are: Visayas (Metro Cebu: Cities of Mandaue, Lapu-Lapy and Cebu); Mindanao (Davao City); and Luzon (Quezon City, PEZA at Cavite and Laguna).

The survey covers three selected industries in the manufacturing sector, which are involved in food processing, electronics, and information and communication technology (ICT). The total number of firms in the sample accumulated 500 firms in the three sites.

The fact-finding mission covers all three areas with the aims of gaining insight on the current situation involving innovation activities and performance, and also investigates the overall understanding and awareness of the innovation survey in general. The information from the site visits and meeting is evaluated to strengthen the recommendation to questionnaire for innovation survey and future censuses in the Philippines. The travel covered the period between 21 and 26 November 2010.

Visayas

On 22 November 2010, with DOST Region VII assistance, Eng. Edilberto Paradela, the project coordinator, arranged site visits and the meeting for Cebu. There was one site visit at Asia Town IT Park and a half day meeting with the local team and the consultant at the DOST Region VII Office.

Asia Town and Ayala Economic Zone

In the morning, the consultant visited the Asia Town IT Park. The Park is owned by Ayala and embraces over 24 hectares of prime industrial land at the center of Cebu City. It was conceived as an integrated special economic zone and modern trading center, with PEZA privileges. There are around 12,000 jobs in Business Process Outsourcing (BPO) and the related service-oriented industry. The Park brands itself

as a green IT park that especially boasts a constructed wetland system which treats sewage using natural means – plants and microorganisms. Mr. Dennis Wong from the International Pharmaceutical Incorporated of the local board for Metro Cebu LPSC summarized for the consultant on site about the innovation of waste treatment. This waste treatment process consumes zero power as the plant's root system acts as carriers for the microorganisms, decomposing the organics in the wastewater and thereby cleaning it in a naturally sustainable cycle.

Courtesy visit to DOST Region VII

In the afternoon, the consultant paid a visit to DOST Region VII. There was an arranged meeting to discuss the pilot project among the local team members, which is comprised of Engr. Rene Burt N. Llanto, Regional Director, DOST VII; Mr. Dennis Wong, the industrial representative; Engr. Edilberto Paradela; NSO representatives and the local consultant.

Reflection:

- According to the meeting, the City of Cebu is the capital city of Cebu and the second largest city in the Philippines, the second most significant metropolitan center in the Philippines, and is recognized as the oldest city established by the Spaniards in the country. Cebuanos have their own dialect and language.
- Cebu is the second key domestic hub of the Philippines. The city is the Philippines' main domestic shipping port and is home to about 80% of the country's domestic shipping companies, while it also hosts the second largest number of international flights in the country.
- The economy has been heavily reliant on local overseas Chinese, especially on trade, agriculture (such as mango), and services. Cebu is a significant center of commerce, trade and industry in the Visayas and Mindanao region.
- Cebu is the favorite city for Koreans to study English.
- DOST Region VII provides industrial standards testing on measurement, food safety, and packaging. There is a furniture and ornament design center to support local industries.
- The city shares the second highest proportion of samples (129 samples) after Quezon City (172 samples).
- Food manufacturing industry in Cebu City tends to be Micro Enterprises as well as Small and Medium Enterprises (SMEs), while non-food industries are Multi-National Corporations (MNCs).
- Business Process Outsourcing (BPO) activity is mainly focused on the call center, which shares a high tendency towards incremental service innovation.
- Electronics and IT manufacturing firms dominate the sample sites, while BPO represents more than one quarter of the non-food industries sample group.
- NSO representatives reflected that there has been no difficulty with understanding of the questionnaires and definitions, while the local consultants presented some concern about the process of data collection.
- A tri-party of private, public RTOs, and the city administration has been formed, which is a major strength of the project.

Mindanao

The visit to Davao City took place on 23 November 2010.

Attending TechBootCamp

In the morning of 23 November 2010, the consultant was invited to attend the morning session on innovation and technologies business by Professor Gregory L. Tangonan, Executive Director for the Congressional Commission on Science, Technology and Engineering (COMSTE) and Director of Ateneo Innovation Center in Quezon City.

Davao Open TechBootCamp is the training program supported by the Ayala Foundation and co-organized by DOST. The training targets academic teams, R&D teams, professional teams and entrepreneurs involved in technology or technology-enabled product services with special focus on the fields of ICT, biotechnology, life science, green technology, sustainability, alternative energy, food science, technology and agriculture productivity and other emerging applied technologies. This three days training program was held at Hotel Elena, in Lanang, Davao.

Meeting with DOST Region XI and DOST core team

In the afternoon, DOST Region XII arranged a meeting between the consultant and the core project team. Attendants were Dr. Anthony C. Sales (Regional Director of DOST XI), Mr. Bert Barriga (President of ICT Davao), the representatives from Davao City, Ms. Cynthia F. Abalos and the DOST core team.

Mr. Barriga, the President of ICT Davao, accompanied the consultant and the DOST core project team to the Davao General Hospital, where his company services the facility by developing low-cost hospital management software.

Reflection:

- The City of Davao is the largest city on the island of Mindanao. It is the most important economy on the island and the third most important urban center in the Philippines.
- In recent years, Davao City has emerged as the business, investment, and tourism hub for the entire southern Philippines.
- Large agricultural plantations and manufacturing activities are among the most important economic blood lines of the region. Davao City largely contributes to making the Philippines the world's top exporter of papaya, mangosteen, and flowers.
- Natural resources and eco-tourism have become increasingly important to economic growth in the region.
- DOST XII is considering appointing a local consultant from University of Philippines at Davao to analyze the results from the survey.
- A tri-party of private, public RTOs, and the city administration has formed, which is a major strength of the project.
- It is noticeable that the representation of the sample for Davao City is the lowest of the group. There are only 45 firms within the sample site. This may reflect a limitation on interpretation of the innovation survey results.
- Also, distribution among SMEs and MNCs in Davao City is mainly concentrated on MCs and SMEs for all sectors, with a bit of contrast to the nature of economic structure of the islands.
- Software and BPO are considered the fastest growing sectors for knowledge-intensive services in Davao. Animations and call centers are among focal sub-sectors for non-food industries.
- The city is under a process of revitalization of the city in order to boost up service-oriented business and induce more foreign direct investment (FDI) into the city.
- Service and food processing associations in Davao are very active. December has been chosen to be the innovation month in Davao as many activities are being initiated by local firms with some support from the city administration and DOST.

Luzon

Meeting with Quezon City team

In the afternoon of 24 November 2010, the Quezon City team arranged a project meeting at Hotel Sulo, Quezon City between 14:00 – 17:00. The consultant was invited to join for dialogue and discussion. Main agendas for the meeting consisted of the review of the First meeting, overview of DOST NCR and Quezon City, the analytical Framework for the Innovation Study, two cases studies on

bakeries and ice cream, and the incubator at the Ateneo Innovation Center, updating on the innovation survey in Quezon City, and planning of committee meetings and project activities for January-June 2011.

Present were Dr. Teresita C. Fortuna, Director of DOST NRC, Dr. Josef T. Yap, and Dr. Jose Ramon Albert from the Philippines Institute for Development Studies (PIDS), as well as representatives from NSO and Quezon City to join the meeting.

On 25 November 2010, the consultant reviewed the findings from these three cities and prepared for speaking on the Filippinovation Forum.

Filippinovation Forum

On 26 November 2010, the consultant had a meeting with the CISASIA team, another project on city innovation supported by IDRC at De La Salle University. The details of the meeting's outcome will be separately reported through the year-end CISASIA interim report for the project's fiscal year of 2010.

In the afternoon, the consultant attended a forum and delivered lecture remarks under the topic of the City, Innovation, Survey, and System: Shifting Paradigm on Innovation Policy for Developing Countries.

Reflection:

- Metro-Manila consists of 16 cities and 1 municipality. Quezon City is the former capital (1948–1976) and the most populous city in the Philippines. The city is the public administrative center for the Philippines.
- According to the scope of sample for the innovation survey, there are three areas within and around Metro Manila to be covered. They are Quezon City, and two PEZA in Cavite and Laguna.
- A tri-party of private, public RTOs, and the city administration was formed, which is the strength of the project.
- As Quezon hosts many leading national universities, the main campuses of two leading universities, the Ateneo de Manila University and the country's National University—the University of the Philippines Diliman—are located in the city, with another 63 colleges and universities.
- Quezon City is home to the Philippines' major broadcasting networks. Television companies such as TV5, ABS-CBN, GMA Network, UNTV, Net 25, GEM TV, NBN, RPN and IBC all have their headquarters in Quezon City.
- BPO activities are also increasingly important for the service sector in Quezon City. Call centers dominate the non-food manufacturing industry.
- The city also enjoys the position of being a large conglomerate proxy; the Quezon City authority shows strong intention for utilizing the results of this pilot in their city development planning.
- Around 25% of the enterprises are registered in the city.
- Cavite and Laguna are southern neighboring provinces of Metro-Manila. Two PEZAs were selected as sample sites. For the majority of firms, they are mainly FDI in IT manufacturing, especially from Japan.
- Both Quezon City and the two other PEZA samples are mainly from non-food industries, which are the opposite of Davao and Cebu with majorities of firms coming from the food industry.
- Quezon City has a good proportion of SMEs and MNCs represented in the sample sites for non-food industries, while the food manufacturing tends to be MCs and SMEs, similar to Davao City and Cebu City.

2.2 Literature review on community innovation survey

Innovation has been recognized among economic and social development debates as one of the key elements to support an industrialization and modernization of developing economies through a capability to introduce new technologies and efficient organizations in a specific sense. In the broader context, innovation in developing economies embraces industrial innovation from a non-technological perspective, a territory which is waiting for academe and policymakers to discover. For this group of nations, innovativeness is frequently represented by various types of activities ranging from a rapid imitation of new products and processes to an adoption of capital equipment and proved production technologies.

Measuring innovation, the mechanisms and techniques to create the comparability of innovativeness among different industries and countries, can be seen as an emerging field for innovation-related policy implications. There has been increasing attention on the application and adaptation of innovation surveys in developing and emerging economies by following or replicating the model first developed in Europe (Eurostat, 2008).

Since the 1990s, there have been two major manuals developed to measure innovation, the Oslo Manual and the Bogota Manual.

- The Community Innovation Survey (CIS) was developed in accordance with the Oslo Manual and has been widely used and applied among developed and developing economies as a guideline for the determination of widely applicable innovation indicators, and as a reliable tool for the measurement of these indicators.
- For developing countries, the Bogota manual can be seen as an attempt among the followers to develop an appropriate measuring technique and scale to fit with their innovation system structure. Therefore, the presence of a reliable guideline for different levels of innovation systems is crucial.

Oslo Manual

The first international experimental survey on innovation was guided by propositions of the Oslo Manual and took place in the European countries. The European Community (EC), which is now the European Union (EU), incorporated with the EUROSTAT, developed a standard questionnaire, the so-called Community Innovation Survey (CIS), which is now in its fourth version, while the EUROSTAT, in collaboration with the Organization for Economic Cooperation and Development (OECD), has determined a core list of questions that permit comparable innovation analysis in Europe.

The limitation of the survey is the subjective nature of innovation, especially on the difficulties of measuring an intangible or complex component, and a consequence of different activities which are difficult to summarize (Arundel et al, 1998). The Oslo Manual defines innovation in a broad sense as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations" (Oslo Manual, p. 46). However, its application in the CIS has generated criticisms since it takes innovation in a narrower sense which may cause a problem in the generation of indicators (Carvalho, 2006).

The first version of the European CIS using a common questionnaire was launched in 1991 and was carried out in 1992. A second version was started in 1997 and completed in 1999, and the third and fourth were launched in 2001 and 2006 respectively. In Turkey, innovation surveys were carried out by using these standard questionnaires with minor changes. In Southeast Asia, Malaysia and Thailand are among countries in ASEAN that apply such a tool into their innovation systems. In general, the early uses of the CIS among the OECD and non-OECD member countries have been mainly faced with:

- A restricted paradigm of innovation concept with a narrow sense
- The limitation of the innovation concept within technological, product, and process innovations (TPP)
- The limitation to accommodate key characteristics and development from different sectors (especially services and manufacturing)
- The complexity of analysis on the relations, linkages between agents, in other words, network effects on innovation system
- The omission of unsuccessful cases
- The measurement of innovation in different factor conditions, particularly in developing countries.

Dynamism of innovation in developing economies

Archibugi and Coco (2005) proposed a set of new indicators for technological capabilities by taking four dimensions of technology into account:

- Innovative activity (patents and scientific publications)
- Technology infrastructure (internet, telephone mainlines and mobile, and electricity consumption)
- Human capital (scientific tertiary enrolment, years of schooling, and literacy rate), and
- Imported technology (foreign direct investment or FDI, technology licensing payments and import of capital goods)

The study (Intarakamnerd & Viotti, 2006) illustrates that there has been a significant divergence between catch-up in faster growing Asian economies on the innovation survey results and their Western counterparts, whose data are more reliable and whose performing pattern of firms are easier to investigate. This reflects that indicators on technological capability in the catching-up innovation system are still problematic, and there might need to be improvement in the existing techniques and indictors in order to raise the measurement standard among these following nations.

After the launching of the innovation surveys among the OECD and EU members, the developing countries followed course and applied the Oslo Manual, coming up with their own versions of the innovation surveys. However, seeing the results of the first few surveys, these countries felt the need to adapt their surveys to the context of their developing world (INTECH, 2004).

The measurement of innovation in developing countries by purely adopting the Oslo Manual for the CIS with some applications can be a painful experience for those who want to understand the evolution of innovation in the catching-up economies. The main reasons for such difficulties and limitations are as follow:

- **Evolutionary paths:** Institutional set-up in the economic structure of developing and less-developed countries from the developed ones.[1]
- **Exclusiveness:** Increasing demand among some developing countries for special techniques and questions to reflect the unique characteristics of their economies and require special indicators to measure their innovativeness.
- **Enterprise process:** When the main specificities of developing countries' innovative environments are carefully considered it can be realized that a special focus on innovation capabilities accumulated by firms and agents are needed.

[1] These structural differences are also considered by some scholars when measuring the science and technology indicators in developing countries.

- **Non-technological dimension:** Innovation activities in developing economies should be understood in a broader sense and the role of organizational and social innovations, which is essential for the absorption of new knowledge and emerging technologies, must be taken into consideration.

Bogota Manual

The attempt to devise indicators of technological innovation for developing countries and to make the innovation survey better suited to the conditions of developing countries was carried out by Latin American scholars, especially those belonging to the Iberoamerican Network of Science and Technology Indicators (RICYT). The Bogota Manual for Standardization of Indicators of Technological Innovation in Latin American and Caribbean Countries was launched as an attempt to overcome the limitations of the Oslo Manual in 2001. Subsequently, this group of Latin America scholars (led by Lugones and Peirano) utilized the Bogota manual as a base, together with comments from researchers and practitioners with experience in innovation surveys in developing countries, to develop an Annex of the Oslo Manual (2005) for Innovation Surveys in Developing Countries. The Bogota manual and the annex of the Oslo Manual had an emphasis on four characteristics of the innovation process in developing countries:

- **Acquisition of embodied technology** (equipment) for both product and process innovation is a major component of innovation as high technology sector in latecomer economies is marginal. In developing countries which are more dependent on resource based low technology sectors, a broader innovation concept should be used in order to take the innovations carried out in low technology sectors into account. A broader definition of innovation, which includes R&D efforts, and efforts regarding "design, installation of new machinery, industrial engineering, acquisition of embodied and disembodied technology, organizational modernization and marketing" (Carvalho, 2006).
- **Innovations in the agricultural sector** have high economic impact, due to the sector's significant overall economic weight.
- **Organizational change** is extremely significant in the innovation process. Besides its direct impact on firm performance, it also contributes to the firm's preparation to absorb new technologies incorporated in machinery and other equipment (the most frequent type of innovation). Heterogeneity frequently prevails with regards to firm technological, organizational and managerial patterns, with 'high tech' firms coexisting with informal businesses (in many cases the majority), and with organizational structures not being professionalized enough, leaving much room for organizational change, often independent from product and process innovation processes.
- **Minor or incremental changes** can be the most frequent type of innovation activity in some developing countries, together with innovative applications of existing products or processes.

Apart from that, the intellectual capabilities of firms in developing countries are vital for the initiation of innovation, and yet difficult to gauge. To measure such capacity, Lugano and Peirano (2004) and Carvalho (2006) suggest the use of ICT frequency. Even though this same concept and indicator is mentioned in the Oslo Manual, a question regarding this factor is not included in CIS. Also, the innovation surveys in the developing countries should have some questions regarding the activities of MNCs and their relationships with other agents. This is believed to add to the knowledge base as to how these countries can benefit more from their activities in their countries.

Currently, Chile conducted four rounds of innovation surveys, while Argentina, Mexico, and Colombia finished their third round of innovation surveys. Brazil, Paraguay, and Peru conducted surveys twice in the past, while there is one survey for Ecuador, Cuba, Venezuela, and Trinidad and Tobago. In Africa,

the most active country to conduct the innovation survey is South Africa, which already has done four rounds of surveys.

2.3 The Survey of innovation activities by establishment

The questionnaire of the Filipino pilot project aims to investigate 3 areas of information:

- General information (Profile of establishments),
- Innovator[2] (Innovation activity), and
- Categorical data for innovators (wider forms of innovation, effects of innovation, and constrain on innovation or effectiveness of appropriation mechanisms, and Innovation-related policies).

By adjusting and applying the Oslo Manual for this questionnaire, the consultant has categorized comments and recommendations into 4 areas:

2.3.1 Types of innovation and innovators

- The Philippines questionnaire covers four different types of innovation, namely product, process, organizational, and marketing. While covering the product and process innovations in detail, the survey has an updated section on the organizational and marketing innovations, which will be a benefit for innovation assessment in the broader perspective.
- The lack of detailed and diverse inquiry on organizational and marketing innovations hinders data collection on non-technological innovations, as such section 12 of the questionnaire, which requires the analyst to understand technology and innovation management at the micro-level.
- In section 6, covering ongoing or abandoned product and process innovation activities, the actors of innovation activities need to be investigated to consider the degree and form of innovation activities, as this various from sector to sector. The effects of externalities, firm potentials, and market failure should also be taken into account.
- Section 6 may need to include service and potential or projects in the pipeline into question numbers 6A and 6B.

2.3.2 Innovation activities

- In section 7, innovation activities and expenditures, the questionnaire is well-covered on conventional innovation activities. For developing economies, there should be integration of a question on the use of ICTs as an essential item. For example, the back office activities that support core processes and yet are invisible to third parties are strongly advised by the manual. (Oslo Manual 2005:143).
- Among other specific innovation activities that are listed as essential to be collected are "industrial design" and "engineering activities". Instead of asking about acquisition of design, the questionnaire should investigate the in-house design activities along-side those with the external inquiry, in addition to the question on marketing innovation in section 13.

2.3.3 Methodology

- Currently, the Oslo manual suggests the use of a separate question for each type of innovation as far as appropriability is concerned. However, the standard survey questionnaire does not differentiate between the types of innovation. As opposed to the Manual, the survey does not

[2] Mainly, on yes/no questions.

include an ordinal scale that can be used to rank the different appropriability methods that are used.

- The Philippines survey has a question covering the different methods of appropriability: patents, registration of designs, trademarks, and copyrights. For developing economies, the exclusion of these items may seriously hinder the information collected on the means of appropriability. Given the fact that the majority of firms in these catching-up economies are MCs and SMEs, the costs of patent applications could prove to be too high for most to incur. Thus, they may have to rely on other methods listed in the manual.
- However, when asking firms on their "confidentiality agreements and trade secrecy," "secrecy that is not covered by legal agreements," and "lead time advantage over competitors," methods recommended by the Manual are considered as negative points for being included in an Asian style survey, but on the other hand, these particular activities influence latecomer innovation activities. Site visits or group interviews may shed some light on these hinder activities.

2.3.4 Obstacles and barriers to innovation

- In Section 10, factors hampering innovation activities, or barriers to innovation, the survey adopted three elements under the Oslo Manual style, which lists five main categories of factors hampering innovation, namely cost, knowledge, market, institutional, and other factors, and comes up with reasons not to innovate.
- However, the survey excludes the institutional element. Since the institutional factors hampering innovation include highly significant issues such as the lack of infrastructure, poor IPR, regulations, standards and taxing, the exclusion of this category hinders the viability of the survey for the Philippines, where these factors are of utmost importance.
- As studying obstacles to innovation is the starting point for policymakers to promote innovation, this section deserves some extra attention for DOST, currently deemed as a weak innovation system in Southeast Asia.

3. Recommendation

3.1 Tabulation and consolidation of innovation survey results

As mentioned earlier, there are four obstacles among developing economies to measure innovation: 1) the different evolutionary paths, 2) the demand on special indicators to measure their innovativeness, 3 the complexity of the enterprise process, and 4) the roles of the non-technological dimension. To assess the innovative capabilities and innovation characteristics of firms in the Philippines context that have continuity on other supporting indicators, especially R&D or national scale of community innovation surveys which has not been in place, can be seen as a challenging type of work for the team members.

According to the questionnaire form of the project, the Filipino team asks eighteen questions of the enterprises, as follows:

1. General information about the establishment
2. Capital participation (as of 31 December 2009)
3. Employment (as of 15 November 2009)
4. Product innovation (Goods and services)
5. Process innovation
6. Ongoing or abandoned product and process innovation activities

7. Innovation activities and expenditures
8. Sources of information and co-operation for innovation activities
9. Effects of innovation
10. Factors hampering innovation activities
11. Intellectual property rights
12. Organizational innovation
13. Marketing innovation
14. Knowledge management
15. Response to government innovation-related policies
16. Other information
17. Certification
18. Contact person

To consolidate the innovation survey results into a meaningful and relevant format, specific tabulation design is required to compile this inquiry. This recommendation is based on the result of innovation surveys from the four existing reports (Document number 2-6).

The consolidated report is document number 6, Results of the 2009 Survey of Innovation Activities (SIA). This is the most important report for the project as it will give the whole picture of innovation performance from four key cities within the project. The report consists of 21 tables and 11 figures, as follows:

- Table 1: R&D as percentage of GDP and R&D per capita in selected ASEAN countries
- Table 2: Distribution of sample establishments by major sector
- Table 3: Summary of NSO field personnel training
- Table 4: Distribution of sample establishments by size and major sector
- Table 5: capital participation across nationality, by size of establishment and area
- Table 6: Share of female employment to total employment across areas by major industry and by size of establishment
- Table 7: Key statistics on innovation activity by size of establishment
- Table 8: Key statistics on innovation activity by major industry
- Table 9: Key statistics on innovation by activity area
- Table 10: Distribution of establishments by innovation activity across industry group and size of establishment
- Table 11: Percentage of establishments that field for intellectual property rights, by innovation activity status
- Table 12: Determination of product innovation, process innovation, and innovation activity
- Table 13: Percentage of establishments that regarded potential barriers to innovation as "high", by size of establishment
- Table 14: Percentage of establishments that regarded potential barriers to innovation as "High", among innovators and non-innovators by major sector
- Table 15: Reasons for no innovation activity by major sector (Non-innovators only)
- Table 16: Percentage of establishments that introduced wider forms of innovation, by major industry and by size of establishment
- Table 17: Percentage of innovation active establishments rating effects of the product and process innovation as "high"
- Table 18: Effects of organizational innovation by major sector and by size of firm (Organizational innovators only)
- Table 19: Effects of marketing innovation by major sector and by size of firm (marketing innovators only)

- Table 20: Establishments rating information sources as of "high" importance, by size of establishment
- Table 21: Co-operation partners (innovation active, collaborative establishments only)
- Table 22: Percentage of firms that considered government support programs that they received highly important for innovation, by establishment size

In general, the current report format provides detail of all the survey statistics with a comprehensive introduction of Filipino science, technology, and innovation positions. However, a sufficient and integrated tabulation is required to serve different purposes and a variety of audiences.

- On city reports (Document number 2-5):
    - All city reports should apply a similar format of tabulation and main sections of the report. Different structure and tabulation may cause difficulty for the reader when comparing and attempting to understand the SIA analysis at a city level.
    - Uniqueness and specific remarks can be treated in a separate section with a minimum amount of supportive tables and figures, before the policy recommendation and conclusion parts.
- On country reports (Document number 6)
    - The team may need to reduce the number of tabulations to around 12 – 15 tables. Some tables are already represented, especially Tables 1, 2, 4, 7, 10, 13, 16, 18, 19, 20, 21, and 22).
    - Some tables can be converted into info-graphics (Tables 5, 6, 8, 9, 14, and 17).
    - Table 12 is a bit difficult to follow. The team should revise all the information into an easy-to-digest format.
    - Tables 3, 11, & 15 can be omitted and integrated into a descriptive form.

All four reports may consider the proposed tabulation below as an alternative design or option or further revision. In order to make a comprehensive and meaningful innovation survey report for the policy maker, eleven major tables should be in place, including:

1. General Filipino innovation surveys with key characteristics and overall results that cover questions 1-3 (size of population, size of sample, response rate, R&D performing firm, innovating firms).

Table 1: **General Filipino innovation surveys**

	Year	Year	Year
Size of population - Manufacturing sector (Food & Electronics) - Service sector (IT) Total			
Size of sample - Manufacturing sector (Food & Electronics) - Service sector (IT) Total			
Response rate (%) - Manufacturing sector (Food & Electronics) - Service sector (IT) Total			
R&D Performing firms (%) - Manufacturing sector (Food & Electronics) - Service sector (IT) Total			
Innovation firms (%) - Manufacturing sector (Food & Electronics) - Service sector (IT) Total			

2. Share of innovating companies that covers questions 4-5 (innovating, product and process innovation, only product innovation, and only process innovation).

Table 2: **Share of innovating companies**

	All	Quezon City	Calabazon	Cebu City	Davao City
Innovating firm		%	%	%	%
Product and process innovation					
Only product innovation					
Only process innovation					

3. Share of innovating companies in respect to firm size (SMEs and Large firms).

Table 3: **Share of innovating companies in respect to firm size**

	All	Quezon City	Calabazon	Cebu City	Davao City
Small and Medium Enterprises (SMEs)		%	%	%	%
Large companies					

4. Share of innovating companies in respect to ownership (partly owned by FDI and 100% Filipino ownership) for question number 2.

Table 4: **Share of innovating companies in respect to ownership**

	All	Quezon City	Calabazon	Cebu City	Davao City
Partly owned by Foreign Firm		%	%	%	%
100% Filipino ownership					

5. Share of companies that conduct R&D and different types of R&D (in house and contract R&D) for question number 7.

Table 5: **Share of companies that conduct R&D and different types of R&D**

	All	Quezon City	Calabazon	Cebu City	Davao City
In house		%	%	%	%
Contract R&D					

6. Share of innovating companies in respect to sectors. (Question number 1)

Table 6: **Share of innovating companies in respect to sectors**

	All	Quezon City	Calabazon	Cebu City	Davao City
Philippine Standard Industrial Classification (PSIC)	PSIC Manufacture of .. %	PSIC Manufacture of .. %	PSIC Manufacture of .. %	PSIC Manufacture of .. %	PSIC Manufacture of .. %

7. Importance of objectives of innovation (Question number 4-5, 9-11)

Table 7: **Importance of objective of innovation**

	All	Quezon City	Calabazon	Cebu City	Davao City
Improve product quality Learn about new technology others…					

8. Percentage of expenditure firms spent on innovation activities in year xxxx (Activities, sectors, and numbers). Three tables, one for manufacturing sector, one for service sector, and one for all sectors. (Question number 7, 14)

Table 8.1: **Percentage of expenditure firms spent on innovation activities in year xxxx (Manufacturing Sector)**

Manufacturing Sector	All	Quezon City	Calabazon	Cebu City	Davao City
R&D - Intramural - Extramural		%	%	%	%
Acquisition of machinery and equipment					
Acquisition of external knowledge					
Training (internal & external)					
Market introduction of innovations					
Design and other preparation for production/deliveries					
Total					

Table 8.2: **Percentage of expenditure firms spent on innovation activities in year xxxx**

(Service Sector)

Service Sector	All	Quezon City	Calabazon	Cebu City	Davao City
R&D - Intramural - Extramural		%	%	%	%
Acquisition of machinery and equipment					
Acquisition of external knowledge					
Training (internal & external)					
Market introduction of innovations					
Design and other preparation for production/deliveries					
Total					

Table 8.3: **Percentage of expenditure firms spent on innovation activities in year xxxx**

Activities	Sector		Overall
	Manufacturing	Service	
R&D - Intramural - Extramural			
Acquisition of machinery and equipment			
Acquisition of external knowledge			
Training (internal & external)			
Market introduction of innovations			
Design and other preparation for production/deliveries			
Total			

9. Evaluation of importance of different sources of information for innovation activities to accommodate questions number 8, 12 -14.

Table 9: **Evaluation of importance of different sources of information for innovation activities**

	All	Quezon City	Calabazon	Cebu City	Davao City
Internal List…		%	%	%	%
External List…					

10. Ranking of external information sources according to importance (Question number 8)

Table 10: **Ranking of external information sources according to importance**

	All	Quezon City	Calabazon	Cebu City	Davao City
Client Customers Competitors Patents Lists of others…		%	%	%	%

11. Assessment of the R&D and innovation environment to analyze question number 14, 15 and 16

Table 11: **Assessment of the R&D and innovation environment**

Business Environment	All	Quezon City	Calabazon	Cebu City	Davao City
- Attitude of people towards innovation - Openness of customers to innovation - Quality of telecommunications and IT services for enabling innovation - Intellectual property protection - Acceptance to failure - Regulatory environment - others		Mean	Mean	Mean	Mean

3.2 Guideline for analysis

The report briefly touches upon the concept innovation system by discussing the fragmented situation of the national innovation system in Philippines.

Figure 1 illustrates a recommended platform to analyze innovation indicators which the country and cities teams may utilize and apply to suit within their specific contexts. There are three main analytical blocs: 1) main characteristics; 2) key measuring areas; and 3) strategic outputs.

- The analysis of the SIA should focus on six main characteristics of an innovation in developing economies' context, which include: size and structure of domestic market and firms; informality of system; public sector involvement; influence and presence of FDI; political leaderships; and system failure.
    - *Size and structure of domestic market:* The team already incorporates this particular section in an introduction part of the consolidated report (See document number 6)
    - *Informality of system:* This is a very important characteristic for the Philippines as the informal economy and its transactions play a very crucial role in the Filipino Innovation System (FIS). Apart from the general description of key innovation indicators, the team should link their analysis on so called formal innovation with the existing knowledge on the informal sector in the country. In order to do this, the team may take a look at the report from countries that apply the Bogota principle into practice, particularly in the cases of Brazil, Chile, and Colombia (See Bogliacino, et al, 2009).
    - *Public sector involvement:* The majority of the public sector organizational structure in developing countries is centralized. This partially describes the current situation in most of the Southeast Asian governmental bodies, while the Philippines is the exceptional case. Apart from a narrative explanation of the insufficient support and inefficiency of the bureaucratic system of the government, the team should emphasize three key issues: national government role (key agencies, national STI policy or Filippinovation, and *** (See Goedihuys & Mytelka, 2005)
    - *Influence and presence of FDI:* Philippines shares a similar situation with some developing economies on being a hub of foreign direct investment (FDI). In this regard, the reports

should highlight the evidence and indicators received from the survey in a dedicated section for technology and innovation capacities. (See Bogot Manual, Archibugi, D. & A. Coco (2005); Intarakamnerd & Viotti, 2006).

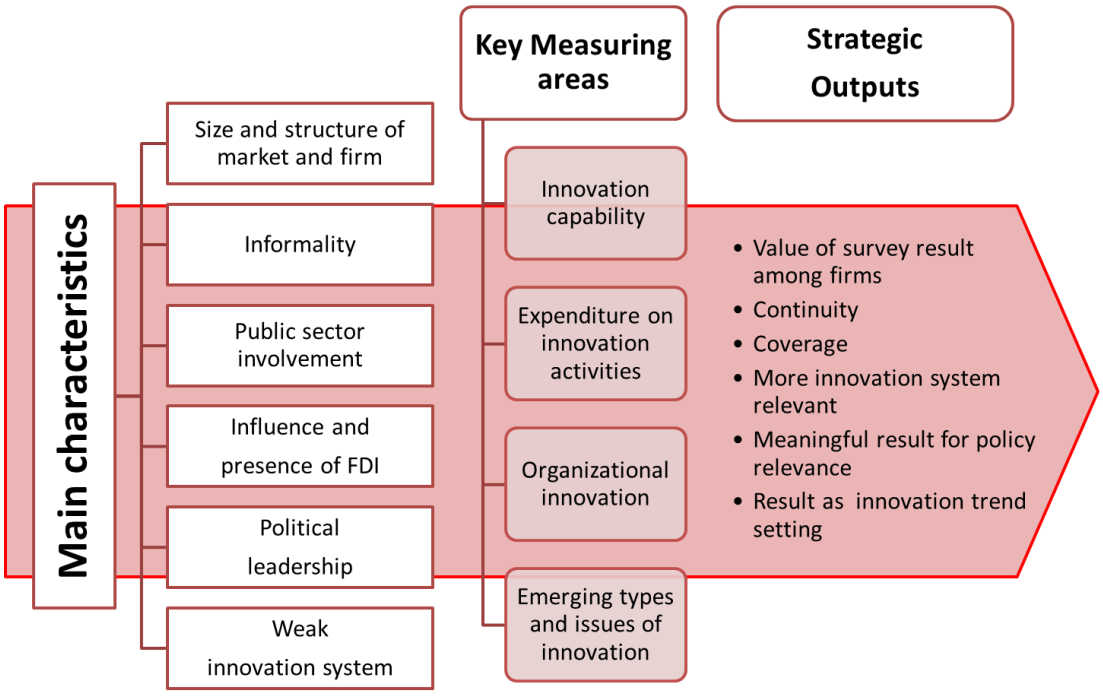
- *Political leaderships:* As the surveys focus on two levels, city and country, the role of political leadership on innovation development should be discussed.
- *System failure:* Both city and country reports should integrate the analysis on the implications of the adoption of the IS approach for innovation policy and introduce key problems into layers, both local and national levels. The analysis of such a system failure should highlight a recent transformation of the city innovation system (CIS) and NIS with special reference to the Filippinovation (See Chaminade, Intarakamnerd, & Sapprasert, 2008).

- As indicated on Section 3.1, the report should illustrate comprehensive indicators with a minimal number of tables. In this framework, the report should separate its analysis of the measurement into four key areas:
  - *Innovation capability*: The report should provide an analysis on a set of determinants of innovation capability, to describe the different stages in which firms, and industrial sectors, can be categorized. For example, differences between manufacturing (automotive and electronics) and service (IT) sectors. Knowledge accumulation, human capital, and organizational routines can be integrated here. This will give a political decision maker and other policy makers a clearer view on the Flippino innovation process and behavior at the enterprise level, especially on the future trends of the job market, economic growth, and technological changes (See Silva et all, 2010; and Intarakamnerd 2011).
  - *Expenditure on innovation activities*: This particular measurement will describe a firm's innovation efforts appropriability, particularly on the intensity of innovation activities and expenditures.
  - *Organizational innovation*: The report already highlights this section. However, a comparison of absorptive capabilities between different sites, sectors, and sizes of the firms will be useful.
  - *Emerging types and issues of innovation*:

1) The report should provide a section on strategic outputs which consolidates:
   - The importance and value of indicators developed by the SIA to the participating audiences
   - Suggest and inform the key stake stakeholders on the need to develop a continuity of SIA in order to leverage the series of indicators into a comparable level for both international and sectoral levels
   - Answer the question regarding coverage size of samples. As the pilot project concentrated on the city scale, the team is required to clarify on this aspect.
   - The indicators need to support a description and guideline for a more detailed understanding on national, sectoral, and regional innovation sytems of the Philippines (NIS/SIS/ and RIS).
   - A brief policy recommendation and prescription with special reference to "the Filippinovation" is needed.

- Extraction from the data and comments can be developed into short and medium term innovation trends, particularly on: 1) product innovations; 2) process innovations; 3) sectoral innovations; 4) organization innovations; 5) job and career development; 6) demand on knowledge and skills; 7) education; 8) innovation gap; 9) weaknesses and system failure; and 10) new forms of innovation.

Figure 1: Innovation Survey & Developing economies



3.3 Innovation survey and Filippinovation

Categories of Innovation Systems in Asian Pacific Emerging Economies

Since mainstream innovation systems analysis has a deep-rooted foundation in production and manufacturing sectors, the categorization of the emerging economies is based on the existence of key institutional and organizational setting up (R&D infrastructures and R&D researchers), activities (such as knowledge production and utilization), performance of key stakeholders (R&D expenditures, patents/royalties/license fees and etc.) and linkages quality (continuity, capability, and learning). Functional-oriented mapping is usually applied to facilitate an understanding on system dynamics and factor conditions of such late-coming innovation systems. Conventionally, the developing economies in East Asia had been categorized as the first-tier and second-tier newly industrializing nations (NICs) in the late 1990s. Three of the ASEAN5 (Malaysia, Singapore, and Thailand), and three other tigers (Taiwan, Korea, and Hong Kong) have enjoyed the first- and second- tier industrial status for the last three decades. The past decade marks an increase in the popularity and importance of techno-globalization as being a major mechanism for a well-structured innovation system to enhance innovativeness and knowledge.

By doing so, we may categorize development levels of Asia Pacific countries' innovation systems into 4 categories.

- **Group 1 Structured innovation system:** This category represents countries with well-established and advanced innovation systems compared to neighboring economies. China and Singapore fall into this group.
- **Group 2 Fractional innovation system:** This category includes countries with weak innovation systems. Some missing links and/or weaknesses exist within the innovation systems although remedial mechanisms and programs are being implemented. Overall, these economies are continuously developing their science and technology (S&T) infrastructures. Specialized institutional units have been established to monitor the advancement of R&D, linkages among sectors, as well as technology commercialization. This group comprises Brunei, Malaysia, Thailand, and the Philippines.
- **Group 3 Entry innovation system:** This category consists of economies that have just begun to develop their innovation systems. S&T infrastructures remain essentially underdeveloped. Additionally, innovation in enterprises in these economies is still mostly basic although some remedial mechanisms have been put in place. Indonesia, Lao PDR, Vietnam, and Cambodia fall in this group.
- **Group 4: Unstructured innovation system:** This category represents nations with no established innovation systems. Innovation management remains a new concept whereas other factors such as institutional arrangements, competencies of manpower, and investment in S&T infrastructure are still being designed. This group includes Myanmar and Timor-Leste.

The Philippines is categorized as a country with the fractional innovation system. Document number 6, results of the 2009 survey of innovation activities (SIA) raises a key question on the importance of a clear and in-depth understanding on the nature of innovation and its performance in the developing country, particularly from a socio-economic perspective.

- The Filipino SIA illustrates an unsurprising result of the survey, which is similar to the other developing economies, both in Asia and Latin America.
- The results indicate that more than half of the sampled enterprises are actively engaged in innovation activities, with large firm domination. Incentives for innovation are generated by customer and market, while a barrier to innovate comes from a negative attitude towards cost of investment. The system has insufficient support from the government, especially for the small and medium sized enterprises (SMEs) to develop new products. Linkage between knowledge producers and users (university and industry linkages) is rather weak, while business-to-business linkage shows a stronger and deeper bond.

The reports mainly focus on interpretation of the SIA results. There should be more discussion and recommendation developed from the key finding of the SIA regarding the Philippines innovation policy or "Filippinovation". The policy recommendation should develop to have a relevancy with the current policy and make the alternative options for the policy makers and decision makers at both city and country levels to utilize such indicators and policy options. As a result, at the end of the report, there should be a dedicated section on policy recommendation.

The policy recommendation for the Filippinovation should focus on four key areas:

1) Creation and promotion of dynamic and similar understanding on the evolving concept of innovation. As the Oslo Manual considers innovation in a broad sense, but the limitation still exists, particularly for the developing countries context and other emerging types of

innovation: social, non-technological, and aesthetic innovations. These innovations show a high potential in the developing counties' innovation system. Key recommendation should be based upon how Filippinovation embraces existing and new types of innovations, product and process innovations, and a diffuse and up-to-date understanding of changing characteristics of innovation among key stakeholders.

2) Recommendation on innovation development in different sectors. The current SIA has already adopted key questions on manufacturing and service sectors. Specific recommendation is required to support these two key sectors at both city and country level.
3) Recommendation to revise and develop a new round of SIA based on the lessons learned from the survey will be a very crucial part.
4) Also, the recommendation to develop a more specific indicator for the informal sector will be a valuable contribution from this exercise.

3.4 Strategizing the Next Step

In order to provide the country team with other relevant information to the current round of SIA and for the future exercise, the current round of SIA should take into account a shift toward a more specific innovation survey fashion among developing nations. There are seven main trends that that are deemed crucial to monitor:

1) There will be an increasing demand on innovation surveys among developed and developing economies (Godin, 2002).
2) There will be more attempts to measure the non-technological dimension of innovation.
3) There will be more sub-national and sectoral specific levels of innovation surveys.
4) Revisiting the concept of capabilities to serve the following countries, Sutz (2006) proposes the emerging features of such survey that relates to a mismatch between the available capabilities to use and search for knowledge to solve problems, and the opportunities to put such capabilities to work for that aim (See also, Intarakamnerd, 2011);
    - *Expansion of boundary*: Include in the design people with experience in measuring public opinion.
    - *Diverse informants*: Formulate questions in a way that allow respondents of very different backgrounds to recognize what they really do in terms of searching how to solve problems, an issue that requires in particular revising the definition of R&D.
    - *Human-orientation*: Ensure that questions related to human resources are made to the whole sample, regarding whether firms declare or not to have introduced innovations during the period of analysis, so the negative indicators "not having skilled human resources" can be fully analyzed in relation to different types of firm characteristics (size, sector, exports, type of capital, performing of innovation).
    - *Knowledge orientation*: Assure that not only the level of studies of the work force will be asked, but that the field of knowledge questions will be asked as well for the entire personnel of the firm; allow for all types of linkages to be included, particularly with technological tailors.

- *Idiosyncratic feature*: Design carefully the "innovative activities" section, allowing idiosyncratic features to emerge, to assure that the category "potentially innovation firm" will be fully recovered.
- *Identification of technological demand*: Reserve a space for the identification of technological demand, linked to questions related to actual policy instruments and those that the respondents may envisage.

5) Regionalization of indicator through comparative exercise and expert community. There have been attempts to form a regional network among Southeast Asia expert on innovation survey.
6) There will be five areas of emerging issues regarding STI in the region, including: 1) STI enculturation; 2) bottom-of-the-Pyramid focus; 3) youth-focused innovation; 4) STI for the green society; and a public-private partnership platform (See National Science, Technology, and Innovation Policy Office, 2011).
7) An on-going attempt to establish ASEAN experts of STI statistics (ASNESTI) in order to identify innovation indicators of common relevance to ASEAN, and to take stock of innovation survey initiatives in ASEAN.

In conjuncture with the emerging trends related to the innovation survey in the region, the team should explore existing survey reports from Malaysia and Thailand to create a comparable format of analysis from the existing indicator in Southeast Asia, while reviewing the surveys from leading countries, particularly from South Korea, China, and India to learn about specific innovative methods and techniques that are emerging from recent and forthcoming surveys.

4. Conclusions

In conclusion, the SIA reports are required to revise the existing report to integrate more comprehensive analysis of statistics, in order to develop a meaningful indictor for the policy maker, as illustrated in figure 1. The composition of the report should have:

1) An introduction: a general description of the main characteristics of the current innovation system, which includes science and technology performance, market and economic review, and an overview of proposed characteristics.
2) An analysis of key measurements: innovation capability; expenditure; organizational innovation; other and emerging trends on innovation.
3) Policy recommendation on city and national innovation system, and a forthcoming survey initiative. City innovation system concept (CIS)[3] and non-technological innovation[4] will be the highlight for the SIA report that reflects the nature of the local administration and socio-economic structure of the nation. The recommendation should indicate how the city level survey can be seen as an alternative path for the Philippines to develop a continuity of innovation survey, how such city innovation analysis can be consolidated to deliver a fruitful recommendation for national innovation policy (the Filippinovation), and the future role of DOST regarding the SIA[5].

[3] City innovation survey already included the city halls and private sectors for high involvement in CIS process since the beginning. City level innovation survey, and decentralization of the innovation system require an enabling environment for knowledge sharing and learning.
[4] Innovation at the-bottom-of-the-Pyramid (iBPO) is booming, but how the Filipinovation will nurture and create value for the future of such service oriented activities still requires more efforts to strategize the particular KIBS sector. The analysis of the SIA should raise this issue by diffusing their analysis with this key issue.
[5] Role of DOST as an intermediary agent on city innovation system can be mastered through an analysis and policy development from this pilot project.

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